

REMARKS

Claims 11-13 and 23-36 are now present in this application.

The specification has been amended, claims 1-10 and 14-22 have been cancelled without prejudice or disclaimer, and claims 25-36 have been presented. Claims 11-13, 23 and 24 are currently withdrawn from consideration. Reconsideration of the application, as amended, is respectfully requested.

Rejection under 35 U.S.C 112

Claims 1 and 14 stand rejected under 35 U.S.C. 112, second paragraph. This rejection is respectfully traversed.

The Examiner has asserted that the limitation "below the surface of the substrate" as recited in claims 1 and 14 is unclear. Without conceding the appropriateness of the Examiner's rejection, but simply to expedite processing of this application, claims 1 and 14 have been cancelled. This rejection has therefore been rendered moot, and should be withdrawn.

Rejections under 35 U.S.C 102(b)

Claims 1, 7, 10, 14 and 20 stand rejected under 35 U.S.C 102(b) as being anticipated by Hieda et al., U.S. Patent No. 5,736,760. This rejection is respectfully traversed.

Without conceding the appropriateness of the Examiner's rejection, but simply to expedite processing of this application, claims 1, 7, 10, 14 and 20 have been cancelled. This rejection has therefore been rendered moot, and should be withdrawn.

Rejection under 35 U.S.C 103(a)

Claims 2-6, 8-9, 15-19, 21 and 22 stand rejected under 35 U.S.C 103(a) as being unpatentable over Hieda in view of Kenny, U.S. Patent No. 4,801,988.

Without conceding the appropriateness of the Examiner's rejection, but simply to expedite processing of this application, claims 2-6, 8, 9, 15-19, 21 and 22 have been cancelled. This rejection has therefore been rendered moot, and should be withdrawn.

Newly Presented Claims

Newly presented independent claim 25 includes the limitations of original claims 1 and 4. Since the rejection under 35 U.S.C 102(b) was not applied against claim 4, it is respectfully submitted that independent claim 25 overcomes at least the rejection under 35 U.S.C 102(b).

With regard to the 35 USC 103 rejection, Hieda and Kenny, either alone or in combination, fail to disclose, teach, or suggest, inter alia, the following features recited by independent claim 25 of the present invention:

"forming a sacrificial layer overlying the buried trench capacitor in each trench and surrounded by an insulating spacer protruding the surface of the sacrificial layer";

"covering portions of the insulating spacers adjacent to the substrate between the neighboring trenches by a masking layer"; and

"removing the uncovered insulating spacers to form the asymmetric collar insulating layer".

Hieda teaches a DRAM having a trench cell comprising an inner dielectric layer 170, in which the inner dielectric layer 170 has a long vertical sidewall portion reaching the upper surface of the substrate and a short vertical sidewall portion bellow the upper surface of the substrate 124 (see col. 26, lines 1-13 and FIG. 34B, for example). However, Hieda does not teach the above-quoted features of independent claim 25. For example, Hieda nowhere teaches or suggests "forming a sacrificial layer overlying the buried trench capacitor in each trench" and "covering portions of the insulating spacers adjacent to the substrate between the neighboring trenches by a masking layer", as is required in independent claim 25 of the present application.

On page 7 of the Office Action, the Examiner reads the sacrificial layer and the masking layer in claim 4 as the elements 550 and 700, respectively, disclosed by Kenny. In fact, the element 550 disclosed by Kenny is a masking oxide layer to allow a trench 560 to be formed down into the semiconductor substrate 210 (see col. 5, lines 42-46 and FIG. 3B, for example), rather than a sacrificial layer employed to formed the asymmetric collar insulating layer, as recited in claim 4. Moreover, Kenny teaches a portion of the thick isolating layer 360 is removed using the photoresist layer 170 as a mask, to form asymmetric isolating layers 340 and 360 (see col. 6, lines 44-50 and FIGS. 3E-3F, for example). However, claim 4 states the asymmetric collar insulating

layer is formed using a sacrificial layer and a masking layer. In this sense, Kenny teaches away from the present invention because Kenny teaches that the asymmetric isolating layers are formed by etching a portion of the thick isolating layer using a masking layer as an etch mask instead of a sacrificial layer and a masking layer. It is noted that independent claim 25 includes the limitations of original claim 4.

Under MPEP 2143, to establish a prima facie case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Clearly, the references utilized by the Examiner fail to satisfy the basic criterion. As discussed above, none of the references teach or suggest the above-quoted features of independent claim 25. Accordingly, it is respectfully submitted that independent claim 25, as well as its dependent claims 26-30, should be in condition for allowance.

With regard to independent claim 31, this claim also recites the above-quoted limitation. That is, claim 31 recites that the asymmetric collar oxide layer is formed employing a sacrificial layer and a masking layer. Thus, independent claim 31, as well as its dependent claims 32-36, should also be allowable over the prior art of record.

In view of the foregoing amendments and remarks, it is respectfully submitted that the prior art utilized by the Examiner fails to teach or suggest the method of the present application.

Accordingly, reconsideration and withdrawal of the 35 USC 102(b) and 103 rejections are respectfully requested.

Conclusion

Favorable reconsideration and an early Notice of Allowance are earnestly solicited.

In the event that any outstanding matters remain in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 
Joe McKinney Mundy, #32,334

KM/asc
0941-0843P

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000